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DIVISION OF WHOLE NUMBER: ANALYSIS OF COMPUTATIONAL
ERRORS OF FORM ONE STUDENTS

Lim Bee Leng

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Abstrak

MEMBAHAGI NOMBOR BULAT: ANALISIS KESILAPAN KOMPUTASI YANG DILAKUKAN OLEH PELAJAR TINGKATAN SATU

Ini adalah satu kajian eksploratori tentang kesilapan komputasi bahagi bagi nombor bulat. Sampel kajian mengandungi 54 orang pelajar Tingkatan Satu dari sebuah sekolah menengah di Negeri Sabah. Mereka dibahagikan kepada 5 kumpulan yang mempunyai pencapaian yang berlainan. Instrumen kajian merupakan satu ujian bertulis yang mengandungi 48 soalan dalam operasi bahagi dengan pembahagi satu-digit dan pembahagi 11 dan 12. Lapan orang pelajar dipilih untuk temu bual. Kajian ini menemui 29 jenis kesilapan sistematik dalam operasi bahagi yang dikategorikan kepada 4 jenis klasifikasi iaitu: kesilapan fakta asas, kesilapan yang berpunca daripada masalah sifar, kesilapan dalam penggunaan baki, dan kesilapan yang timbul daripada prosedur yang salah. Kesilapan yang paling kerap adalah: meninggalkan sifar terakhir dalam hasil bahagi (22%), kesilapan fakta darab (17%), kesilapan fakta bahagi (14%), meninggalkan sifar bukan terakhir (14%), dan menggunakan baki yang melebihi pembahagi (12%). Perbandingan kesilapan antara kumpulan yang mempunyai pencapaian yang berlainan menunjukkan bahawa pelajar kumpulan pencapaian tinggi tidak menghadapi masalah dalam fakta asas, tetapi membuat kesilapan meninggalkan sifar terakhir and sifar bukan terakhir. Pelajar dari kumpulan pencapaian sederhana dan pencapaian rendah menghadapi masalah mengingatkan fakta darab dan fakta bahagi. Menggunakan

prosedur yang salah adalah paling kerap bagi kumpulan pelajar pencapaian rendah. Respons secara rawak hanya ditemui di kumpulan pelajar pencapaian rendah. Kesilapan komputasi berpunca daripada kekurangan fahaman konseptual tentang makna dan algoritma bahagi. Makna membahagi dalam situasi *pengukuran* jarang dirujuk dalam pengiraan dan ini menimbulkan kesilapan meninggalkan baki yang lebih besar daripada pembahagi. Pelajar menghadapi masalah dalam konsep nilai tempat dan sifar sebagai pemegang nilai tempat. Mereka juga terkeliru tentang identiti operasi yang melibatkan 0 dan 1. Pelajar pencapaian rendah menyongsangkan subtrahend dengan minuend, dan pembahagi dengan dividen supaya proses pengumpulan semula dapat dielakkan. Kebanyakan pelajar masih belum menguasai fakta darab.

Abstract

This is an exploratory study on the computational errors in whole number division of a sample of 54 Form One students from a suburban secondary school in Sabah. These students were classified into 5 different achieving groups. The instrument was a written test comprising 48 items in division computation of one-digit divisors and two-digit divisors of 11 and 12. Oral interviews were conducted on 8 selected students. This study identified 29 types of systematic errors which were categorized into 4 classifications: basic fact errors, errors arising from zero difficulties, errors occurring in the use of remainders, and errors from faulty procedures. The most frequent errors were: omitting final zero in quotient (22%), multiplication fact errors (17%), division fact errors (14%), omitting embedded zero (14%), and using remainder bigger than the divisor (12%). Comparisons between the different groups of achievers showed that high achieving students had no difficulty with basic facts, but made errors in omitting final and embedded zeros. Average and low achieving students made errors in multiplication and division facts. Faulty procedures were most common in the low achieving students. Random responses were only observed in the low achieving students. The sources of computational errors could be traced to inadequate conceptual understanding of the meaning of division process and the division algorithms. The meaning of division in the *measurement* situation was seldom considered in their computation and this gave rise to using remainder bigger than divisor. Students had difficulty with concepts such as place value and zero as

placeholder. They also showed confusion in operational identities involving 0 and 1. Low achieving students reversed subtrahend and minuend, and divisor and dividend to avoid regrouping process in their computations. Majority of the students still lacked mastery of multiplication facts.

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